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Sectoral Labour Mobility and Unemployment in Canada

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Sectoral Labour Mobility and Unemployment in Canada

Evidence for the 1980s

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Contents

Acknowledgments vii

Foreword ix

Abstract xi

Introduction 1

Sectoral-Shifts Hypothesis: Implications for Sectoral Labour Mobility and Unemployment 2
- The Formal Model 2
- Sectoral-Shifts Hypothesis and Sectoral Labour Mobility 4

Sectoral Labour Mobility and Unemployment: Canadian Evidence 6
- The Aggregate Unemployment Rate and Interindustry Labour Mobility: Time-Series Evidence 6
- Sectoral Labour Mobility: Microeconomic Evidence 8
  - Separation and Postseparation Experiences from the LMAS 9
  - The Experiences of Job Finders in 1986 9
  - A Multivariate Analysis Using LMAS Data 15

Impediments to Interindustry Mobility 22
- Industrial Restructuring and the Changing Nature of Jobs 22
- Employment Uncertainty 23
- Spill-Over Effects 24
- Constraints on Sectoral Mobility Among Older Workers 25

Conclusions and Inferences 28

A The Labour Market Activity Survey, 1986 33

B Definitions of Variables 37

Notes 41

List of Tables 45

References 47

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Foreword

The industrial composition of employment is constantly changing. In an increasingly integrated global economy, Canadian industries face intense competition, and while many industries and firms successfully meet this competition, others do not. The closures of those that do not meet this competition leave behind unemployed workers. Other changes can also generate industry-specific unemployment. For example, the oil-price shocks of the late 1970s affected different industries differently; in some industries, they resulted in layoffs and unemployment for some individuals.

This paper analyses the fates of workers who are separated from their jobs. Where do they find their next job? How long does it take them to find one? Do demographic and other individual characteristics have a bearing on the probability of finding a new job? The answers to these questions are important, because they provide policy guides for addressing the needs of those individuals most affected by unemployment. For example, the analysis indicates that involuntarily separated workers and older individuals experience longer duration of unemployment. As a result, they represent a disproportionate share of the long-term unemployed. Overall, the analysis suggests that interindustry mobility declined between 1980 and 1986.

These findings are a cause for concern. One of the major labour market issues currently confronting Canada is the need to reallocate labour from declining to expanding sectors. If the reallocation is slow, unemployment will increase. In part, the speed of reallocation depends on the flexibility of workers and how capable they are of acquiring alternative skills. This paper suggests that policy emphasis be placed on instruments that encourage alternative job training.

This research formed part of the background to *Transitions for the 90s*, the Council's Twenty-Seventh Annual Review [1990], and the 1988 statement, *Good Jobs, Bad Jobs*; it also contributed to the Council's research report, *Employment in the Service Economy* [1991]. Surendra Gera and Syed Sajjadur Rahman are economists on the staff of the Economic Council of Canada.

Judith Maxwell
Chairman

Abstract

The purpose of this paper is to investigate patterns of sectoral labour mobility, unemployment, and labour market adjustment in the 1980s in Canada. The starting point for the analysis is the "sectoral-shifts" hypothesis proposed by Lilien [1982]. According to this hypothesis, slow labour reallocation will hinder the ability of workers to adapt to shifting patterns of labour demand arising from sector-specific events – whether they are evolutionary (e.g., the rise of the service sector) or discreet (e.g., the oil-price shocks) in nature – and can result in an increase in unemployment. Understanding the interaction between sectoral labour mobility and unemployment, then, is critical in designing policies to alleviate the hardship associated with changes in the sectoral composition of economic activities.

Three questions are specifically addressed in this paper:

- At the aggregate level, are sectoral labour mobility patterns procyclical, and are periods of high unemployment characterized by low interindustry mobility?

- At the individual level, does the unemployment experience differ between workers who stay in their own industries (stayers) and those who change industries (changers)?

- What factors inhibit interindustry mobility?

The evidence for the aggregate relationship is drawn from time-series data over the 1980s. Individual mobility patterns are examined using data from the Labour Market Activity Survey of 1986.

The time-series evidence indicates that interindustry labour mobility was procyclical during the period 1980-86, but the mobility rate in 1985-86 was lower than that of the prerecessionary period of 1980-81. The lower mobility rate in the period 1985-86 indicates that the adjustment process in Canadian labour markets was slow.

The analysis of individual experiences shows that in 1986:

- The unemployment experience of the majority of the job finders can be viewed as frictional in nature and part of the efficient functioning of the labour market. Industry changers accounted for a higher proportion of this type of joblessness than did industry stayers.

- Involuntarily separated and older job finders experienced relatively higher durations of unemployment.

- About 20 per cent of the separated who did not find a job remained jobless for over six months. Older workers and involuntarily separated workers bore a disproportionate burden of this unemployment.

Overall, factors such as unemployment uncertainty (the inability of separated workers to predict their chances of re-employment in another industry) and spill-over effects (the decrease/increase in employment in one industry leading to an increase/decrease in unemployment in another) as well as the ongoing process of industrial restructuring in Canada may have led to a decline in interindustry mobility and a rise in long durations of joblessness, particularly among those who did not find a job.

The policies that may have the most beneficial effects in the presence of sectoral shifts are those designed to facilitate the reallocation of labour across industries, for instance, policy instruments that encourage the accumulation of alternative job training.

Introduction

The prevalence of high and persistent unemployment in Canada in the 1980s has been the subject of considerable research. Some studies have attempted to explain these high unemployment rates by focusing on factors affecting the natural rate of unemployment. They generally conclude that the bulk of the unemployment in the 1980s was due to structural changes caused by factors such as increasing oil prices and declines in international commodity prices [see, for example, Burns, 1990; McCallum, 1987; Rose, 1988; and Fortin, 1989]. Other studies have analysed the persistence of unemployment in the 1980s, concentrating on the behaviour of unemployment flows and their implications for duration of unemployment [Corak, 1990; Rahman and Gera, 1990*b*]. They conclude that persistent unemployment has been mainly due to a decline in outflow rates and a concentration of unemployment among the long-term unemployed.

The relationship between sectoral labour mobility and unemployment has not been paid much attention in this literature. Nevertheless, sectoral transitions in economic activities pose a considerable challenge to workers. These transitions are a result of either economy-wide or sector-specific shocks and lead to changes in the industrial composition of employment; some industries gain jobs while others lose them. The response of the labour market to changes in sectoral employment patterns will depend, to a large degree, on the ability of workers to move to other industries. Slow labour reallocation among industries hinders the ability of workers to adapt quickly to shifting patterns of labour demand. The result can be an increase in unemployment. Understanding the interactions between sectoral labour mobility processes and unemployment, then, is critical in designing labour market policies to alleviate the hardship associated with changes in the industrial composition of economic activities.

The purpose of this paper is to investigate patterns of sectoral labour mobility, unemployment, and labour market adjustment in the 1980s in Canada. Three issues are specifically addressed. *First*, at the aggregate level, we ask whether sectoral labour mobility is procyclical – are periods of high unemployment characterized by low interindustry mobility? Low mobility in a high unemployment situation can lead to "persistence," and can turn the effects of a transitory shock (such as a recession) into a more permanent phenomenon. The result can be an increase in the natural rate of unemployment.

Second, at the microeconomic level, the paper examines the sectoral mobility patterns of individuals who are separated from their jobs. Are there differences in the interindustry mobility of different groups? For example, do industry changers (those who move to a different industry) or industry stayers

(those who seek a new job within the same industry sector) experience higher durations of joblessness?

Third, the paper examines factors inhibiting interindustry labour mobility.

The Sectoral-Shifts Hypothesis: Implications for Sectoral Labour Mobility and Unemployment

The starting point for our analysis is the implications for labour mobility and unemployment of the so called "sectoral-shifts" hypothesis. This hypothesis generates testable implications about the relationship between sectoral labour mobility and unemployment.

The basic premise of the sectoral-shifts hypothesis is that the natural rate of unemployment is intimately linked to the process of labour reallocation. In particular, the pace at which labour reallocation occurs in response to intrasectoral and intersectoral shifts in employment is critical in determining the natural rate. The slower the pace, the higher the natural rate is likely to be.

As argued by Lilien [1982, 1984], this hypothesis offered an explanation for the rising trend in the unemployment rate in the United States, particularly during the 1970s. It represented a departure from the traditional macroeconomic view that aggregate fluctuations were generally caused by aggregate shocks; i.e., that much of the observed unemployment was cyclical. Lilien suggests that events such as rapid technological changes, shifts in product demand, or major changes in relative prices (for example, the oil-price shock of the late 1970s) lead firms to adjust the sizes of their labour forces over and above the normal continual adjustments. This adjustment process can result in the separation of some workers from their jobs. If the pace of labour reallocation is slow, it will take time for separated workers to be matched with new jobs, and some increase in the level of unemployment will be inevitable.

The most important implication of this theory is that to the extent that sector-specific shocks are disproportionate and vary over time, there is no reason for the natural rate to be constant over time. Thus the sectoral-shifts hypothesis implies a variable natural rate.

The Formal Model

The formal model constructed by Lilien [1982] to analyse the implications of sectoral shifts on unemployment is similar in spirit to Lucas and Prescott's equilibrium search model [1974].[1] Lucas and Prescott consider a situation where labour is exchanged on many spatially and informationally distinct

"islands" and labour mobility is time-consuming. The product demands in each of those markets are subject to stochastic fluctuations that lead to temporary differences in wages between the "islands" and encourage workers in the adversely affected sectors to search for a better location. This search process is time-consuming and generates unemployment. If the stochastic fluctuations in the various sectors are identical and independent of each other, a constant equilibrium unemployment is generated.

Lilien suggests that there is little reason to believe that the shocks will be identical across firms within a sector or across sectors, or that the shocks will be of the same magnitude over time. Disproportionate changes may occur in some firms or sectors in response to changes in factors such as technology, product demand, international competitiveness, and the supply of inputs. These changes will lead some firms and/or sectors to expand their work forces, while others reduce theirs. If workers in the declining segments of the economy find it difficult to obtain jobs in the expanding segments, unemployment will increase. That increase will occur even if aggregate demand remains constant.

A simple mathematical formulation can be utilized to illustrate the sectoral-shifts hypothesis. A firm's hiring of workers can be divided into two components – an aggregate component and a firm-specific component. The aggregate component is in response to economy-wide fluctuations and is common to all firms; the firm-specific component is in response to the unique fluctuations faced by the firm. Let h be the net hiring (the rate of change of employment) by the firm. The two components of h are:

$$h = H + e \tag{1}$$

where H is the aggregate rate of change in employment and e is the firm-specific component. e is distributed with variance (σ) among the various firms. If $h < 0$, the firms lay off workers; if $h > 0$, the firms hire workers.

The economy-wide relationships can be arrived at by summing up over all firms. This relationship is

$$H = A - L \tag{2}$$

$$L = g(H, \sigma(t)) \tag{3}$$

$$A = H + g(H, \sigma(t)) \tag{4}$$

where A is the aggregate accessions, L is the aggregate layoffs, and $0 > g < 1$. If the dispersion in the hiring increases, as would be indicated by an increasing σ when H is held constant, both A and L will increase.

Let the duration of unemployment be influenced by changes in the aggregate demand conditions, $X(t)$. The components of $X(t)$ most likely to affect the duration of unemployment are the unanticipated changes. Suppose also that the aggregate labour force is constant; in this case, H, the aggregate rate of change in employment, is equal to the negative of the change in unemployment. It is then possible to derive a dynamic unemployment equation:

$$U(t) = k\,[U(t-1), \sigma\,(t), X(t)]. \qquad (5)$$

The natural rate of unemployment is now a function of σ – the variance in the firm-specific component of the net hiring rate of the firms – and of $X(t)$, the unanticipated components of aggregate demand, including unanticipated movements in wages and prices.[2]

Empirical testing of the impact of sectoral shifts on unemployment has been mainly at the aggregate level. Researchers have estimated reduced-form unemployment equations (variants of equation 5) that include a measure of σ as an explanatory variable. In operational terms, this variable is defined by Lilien [1982] as the standard deviation of the employment growth rates of the individual industries from the average employment growth in all industries, weighted by each industry's share in total employment. On balance, the macroeconomic evidence on the impact of sectoral shifts (as measured by the employment dispersion indices) on fluctuations in aggregate unemployment rates is mixed. It has been argued that several events influence the reallocation of labour, and that an aggregate measure, such as an employment-dispersion index, is incapable of articulating the different impacts of those events.[3]

The Sectoral-Shifts Hypothesis and Sectoral Labour Mobility

The major drawback of aggregate analysis of the sectoral-shifts process is its inability to shed light on the labour reallocation process and, in particular, on the pace at which workers change jobs and industries. Recall that the sectoral-shifts hypothesis argues that for firm-specific or sector-specific shocks to generate unemployment, the labour reallocation process needs to be time-consuming. If workers could move between firms and industries easily and quickly, the adjustment to these shocks would be accomplished without generating significant unemployment. In establishing whether the sectoral-shifts hypothesis is valid or not, then, it is important to examine intersectoral labour mobility. Such an examination requires the analysis of microeconomic data on individuals' unemployment and mobility.

One important example of this type of analysis is Murphy and Topel's [1987] study of the sectoral mobility of male workers in the United States

over the period 1970-85. They distinguish between two types of workers – "stayers" who, having lost their jobs, find new ones in the same industries, and "changers" who, having lost their jobs in one industry or sector, find new jobs in another.

Murphy and Topel argue that the distinction between stayers and changers is important. According to them, it is the "changers" – those who take part in the intersectoral (or interindustrial) mobility process – who are important in an analysis of the sectoral-shifts hypothesis: "The key implications of the *sectoral-shifts* theory refer to the incidence of unemployment as a consequence of the sectoral mobility of labour" [Murphy and Topel, 1987, p. 43].

They suggest two testable hypotheses to ascertain the importance of intrasectoral and intersectoral labour mobility and, by extension, of sectoral shifts in explaining unemployment:[4]

- Interindustry labour mobility must be countercyclical. This mobility should be highest (or lowest) in periods of high (or low) unemployment.

- Industry changers should account for the major part of variations in unemployment.

Analysing the microdata on the sectoral mobility of males in the United States over the period 1975-85, they find that mobility across sectors was procyclical, with the sharpest declines in mobility having taken place during the recessions of 1975 and 1983. Thus the pace of labour reallocation appears to be greater in expansionary periods than during recessionary periods. A secular decline in the sectoral mobility of adult males is also apparent. Murphy and Topel also find that it is stayers who contribute more to cyclical fluctuations in the overall incidence of unemployment. Both sets of evidence are contrary to their interpretation of the sectoral-shifts hypothesis.

Lilien [1987], in his comments on Murphy and Topel's paper, challenges their formulation of the testable hypotheses. He suggests that what they consider "damning" evidence in fact supports the sectoral-shifts hypothesis. His argument, towards which the present authors are sympathetic, is as follows. The key components of the sectoral-shifts hypothesis are twofold. First, there will be some periods during which there are exceptional shifts in the pattern of labour demand and employment. These shifts will not be the result of aggregate disturbances, but of a multitude of disproportionate sector-specific shocks. Second, the Labour reallocation process induced by these intersectoral shocks will be time-consuming. As argued before, if the pace of reallocation is quick and not costly, the adjustment (in the labour market) will not generate unemployment. If, however, the reallocation process is slow, unemployment will increase – a result of the increasing duration of joblessness. Thus

"unemployment generated by a particular set of demand shocks is inversely not positively related to the speed of labour reallocation" [Lilien, 1987, p. 64]. The lower the level of mobility, the slower the pace of reallocation and hence the higher the unemployment. This suggests that mobility should be procyclical. To Lilien, Murphy and Topel's evidence that stayers account for a higher proportion of the unemployed also supports the sectoral-shifts hypothesis: "It is the failure of workers to abandon their sectors of attachment for industries where they may be productively employed that is responsible for rising unemployment" [Lilien, 1987, p. 65].

Sectoral Labour Mobility and Unemployment: Canadian Evidence

In this section, we examine the microeconomic implications of the sectoral-shifts hypothesis using Canadian data. In particular, we hope to ascertain: 1) whether interindustry labour mobility patterns were procyclical over the recent business cycle (1981-86), and 2) which group, industry stayers or changers, experienced higher unemployment? The evidence for the latter is drawn from the Labour Market Activity Survey (LMAS) of 1986, which allows us to ascertain the characteristics and postseparation status of individuals who separated from a job in 1986.

The Aggregate Unemployment Rate and Interindustry Labour Mobility: Time-Series Evidence

The major issue here is whether changes in mobility patterns are procyclical or countercyclical. Recall that Murphy and Topel posit that a positive relationship between those variables would indicate support for the sectoral-shifts hypothesis, whereas Lilien [1987] suggests that a negative relationship would validate the sectoral-shifts hypothesis.

Table 1 presents the evidence on interindustry mobility rates – defined as the proportion of the employed who changed industries – in Canada and the United States for the period 1980-86. The Canadian evidence is based on data from Osberg [1988] and the U.S. evidence is from Murphy and Topel [1987]. The Canadian mobility rates are based on a 52-industry classification and are taken from the Labour Force Survey (LFS). Osberg constructed a quasi-longitudinal file, using data from the LFS sample for 1980-81, 1981-82, and 1985-86. The construction of this file was based on a specific feature of the LFS – namely, that respondents are interviewed over six successive months. In this case, the data derived from the September interviews were compared with the responses of the same people to the Annual Work Patterns Survey (AWPS) of the following January and with the LFS of the following February.

Table 1

Aggregate Unemployment and Interindustry Mobility, Canada and the United States, 1980-81, 1982-83, and 1985-86

	1980-81	1982-83	1985-86
		(Per cent)	
Canada			
Mobility rate[1]			
Male	9.42	6.92	8.52
Female	10.08	5.54	8.94
Unemployment rate	7.3	12.4	9.8
United States[2]			
Mobility rate[3]	8.24	7.57	7.62*
Unemployment rate	6.15	9.33	5.82

*Data for 1985.

1 The annual mobility rates for Canada are defined as the proportion of those employed in both September and February who changed industry of employment.

2 U. S. data are for males only.

3 The annual mobility rates for the United States are defined as the proportion of experienced male workers who reported that their current employer is different from the one who employed them for the longest period over the past year.

SOURCE Estimates by the authors, based on Osberg [1988*b*]; and Murphy and Topel [1987].

The results show that, during the 1980s, interindustry mobility was procyclical in Canada. The mobility and aggregate unemployment rates moved in opposite directions. Interindustry mobility tended to decline during the period of high unemployment (1982-83) and increase during periods of low unemployment. About 8.5 per cent of male workers and 9 per cent of female workers changed industries during 1985-86.[5] These findings suggest that Lilien's view of a negative relationship between mobility rates and the aggregate unemployment rate holds true for Canada.

The presence of high unemployment and relatively low mobility during the 1982-83 recessionary period suggests that labour market maladjustments intensified during that period. The severity of the recession resulted in a decline in employment and reduced job opportunities across all sectors of the economy. The resulting low mobility translated into longer spells of unemployment. In this sense, the persistence of unemployment observed during the 1980s can be interpreted as a symptom of the low mobility of workers.

An inverse relationship between interindustry labour mobility and unemployment is also evident during periods of recovery and expansion. As the mobility rate increased, the unemployment rate declined. The fact that this

was true of the entire course of the business cycle suggests that fluctuations in interindustry labour mobility are important in explaining movements in unemployment.

The negative relationship between interindustry labour mobility and unemployment also holds for the United States. However, there was greater fluctuation in the mobility rate for males in Canada than in the United States over the course of the business cycle. And Canada's unemployment rate both rose more sharply during the recession and fell more slowly during the subsequent recovery and expansion years than did that of the United States. These differences suggest that there is an asymmetry between the responses of the unemployment rates of the two countries to changes in interindustry mobility. The Canadian situation was one of greater volatility in mobility rates in response to changes in the level of economic activity; however, while unemployment rose faster in Canada during the recession, its subsequent decline was sluggish compared with the decline of U.S. unemployment. This means that labour market adjustment was slower in Canada than it was in the United States in the postrecession years.

Sectoral Labour Mobility: Microeconomic Evidence

We now turn to the microeconomic data on intra-industry and interindustry mobility and unemployment. The key questions we ask are: What is the sectoral mobility of workers who have become separated from their jobs? What is the unemployment experience of industry stayers and changers? Does it take longer for industry changers to find new jobs? What other characteristics determine the length of time needed to find new employment? In terms of the test of the sectoral-shifts hypothesis, recall that Murphy and Topel suggest that industry changers would account for most of the unemployment, while Lilien posits that the stayers would bear the brunt of the unemployment.

The evidence on individual adjustment is drawn from the Labour Market Activity Survey (LMAS) of 1986 (see Appendix A for details on the LMAS). The LMAS reports up to a maximum of five jobs per individual during 1986. However, the number of observations for the third, fourth, and fifth jobs held is too low for meaningful statistical analysis. For this reason, the focus in this paper is on individuals who separated from their first job held in 1986, their success or failure in finding a second job within 1986, and the characteristics of the second job. It is important here to clarify the meaning of the term *first job*. The term does not necessarily refer to the very first job ever held but to the *first job held in 1986*, regardless of when it started.

The 1986 evidence should not be interpreted as being representative of sectoral labour mobility and unemployment experiences over all phases of

the business cycle. Rather, it should be treated as evidence about mobility and unemployment at a particular level of aggregate employment and unemployment. Nevertheless, the evidence for 1986 is important. That year was part of a long expansionary phase of the Canadian economy and followed the preceding recessionary phase by about four years. The mobility patterns observed in 1986 may therefore be said to be relatively independent of the lingering effects of the downturn.

We also distinguish between individuals who found a new job in 1986 after being separated from their previous job earlier in the year, and those who did not. Not all individuals who separate from a job in a given year will find another job quickly. Some may not find a new job at all and may suffer long spells of unemployment. For policy purposes, it is important to know the characteristics of the latter group and understand their adjustment experiences.

Separation and Postseparation Experiences from the LMAS

Our estimates from the LMAS data show that over 28 per cent of the Canadian labour force, or about 3.6 million workers, experienced at least one job separation during 1986. This is an indication of the turnover rate – the rate at which workers normally leave their employers – in the labour market. It also suggests that the Canadian labour market is characterized by a considerable amount of "churning."

Successful labour market adjustment depends on the ability of separated workers to find new employment opportunities. But they may be unemployed for a considerable period of time before finding another job. They may not find a job at all, and remain unemployed or withdraw from the labour force. In addition, the adjustment process will critically depend on the prevailing wage conditions and workers' expectations regarding future wages.

The Experience of Job Finders in 1986

Intra-industry and Interindustry Mobility — The pattern of movement by workers between firms, industries, and sectors is an important indicator of fluidity in the labour market. The easier this movement, the more easily the labour market adjusts to the transition of workers between jobs. The LMAS provides details about the movement of workers between jobs in 52 industries and 49 occupations. We consider the industry and occupation characteristics at various levels of aggregation, which are listed in Appendix A.

In Table 2 we report the *mobility of workers between industries* by selected characteristics. Four types of mobility are considered. First, do the separated

Table 2

Sectoral and Industrial Movement of Job Finders, by Reason for Separation and Age, Canada, 1986

	Same industry	Same industry group	Same sector	New sector	Total
			(Per cent)		
All job finders	38.2	12.0	27.5	22.3	100.0
Reason for separation					
Quit (nonpersonal)	39.4	11.8	27.6	21.2	100.0
Involuntary	34.5	11.9	28.0	25.5	100.0
Age					
16-19	28.7	11.8	38.6	20.9	100.0
20-24	35.6	11.7	30.3	22.5	100.0
25-34	40.3	12.4	23.1	24.2	100.0
35-44	43.3	12.1	21.9	22.7	100.0
45-54	50.3	9.4	25.1	15.2	100.0
55-64	42.2	18.5	18.7	20.6	100.0

SOURCE Estimates by the authors, based on data from the Labour Market Activity Survey, 1986.

workers find a new job in the *same industry*? Here, the consideration is based on a 52-industry classification. Second, do they move to a closely related industry but not to the same industry (*same industry group*)? Here, the 52 industries are collapsed into seven industry groups. One example of this type of mobility is the movement from one industry to another within the manufacturing industry group. Third, do they stay within the same sector but move to a different industry and industry group (*same sector*)? The sectors considered here are the goods and the service sectors. Fourth, do they move to *new sectors*?

A majority of separated workers in 1986 (60 per cent) found another job in a different industry that year. On a disaggregated basis:

- The mobility patterns of the involuntarily separated and the quits were broadly similar. Roughly one quarter of job finders moved between the goods and the service sectors.

- Interindustry mobility generally tended to decline with age – the two youngest age groups (16-19 and 20-24) were marked by relatively high mobility.

While workers do change industries, they tend to stay within their own sector, especially if they are in a service industry (see Table 3). A significant proportion of job changers (about 37 per cent) from the goods sector found their next job in the service sector, an indication of the concentration of employment growth in the service sector in the 1980s.[6]

Table 3

Sectoral Movement of Job Changers and Reason for Separation, by Sectors of Origin and Destination, Canada, 1986

	Sectoral movement	Quit (nonpersonal)	Involuntary
		(Per cent)	
From goods-sector jobs			
To goods-sector jobs	62.9	63.2	64.3
To service-sector jobs	37.1	36.8	35.7
From service-sector jobs			
To service-sector jobs	83.1	83.2	80.3
To goods-sector jobs	16.9	16.8	19.7

Source: Estimates by the authors, based on data from the Labour Market Activity Survey, 1986.

Unemployment and Interindustry Mobility — The LMAS data show that about 21 per cent of the total labour force experienced at least one week of unemployment in 1986. Of the 21 per cent, about 6 per cent was accounted for by industry changers, while successful stayers accounted for another 3 per cent. The remaining portion comprised unsuccessful stayers – i.e., those individuals who, after being separated from their job in 1986, were unable to find a new job during the year.

The data indicate that a majority of the job finders were able to make the transition with no or little time spent between jobs (see Table 4). Of all the job finders, about one third moved from one job to another with no intervening spells of joblessness. One example of such individuals would be those who searched for a new job while employed. This group included a greater proportion of people who quit their jobs than of those who separated involuntarily, and of prime-aged workers (relative to other age groups). The evidence also indicates that about two thirds of all job finders found a job within four weeks, and another 23 per cent found a new job within the next 10 weeks.

Not all job finders were so fortunate, however. Some had to wait for 27 weeks or more before finding a new job. While the proportion of these individuals is relatively small – 3.2 per cent according to the LMAS – their contribution to the persistence of unemployment in the 1980s has been significant. Among job finders, the incidence of long-term joblessness – 27 weeks or more – was higher for the involuntarily separated and for older workers.[7]

As far as the duration of joblessness is concerned, the sector of origin and destination makes very little difference. Workers leaving a job in the goods sector and finding a job in the goods or the service sector spent about the same length of time jobless as their counterparts leaving the service sector.

Differences in the length of transition periods (between the first and second jobs) are also evident when industrial and occupational mobility is considered (see Table 5). Especially noticeable is the higher mean duration of joblessness of the involuntarily separated among both industry stayers and industry changers, especially the latter. The pattern is similar when movement between occupations is considered. The occupation stayers had a lower duration of joblessness than the occupation changers in both separation categories. Finally, the involuntarily separated experienced greater periods of joblessness than the quits, whether they stayed within their occupation group or moved to another occupation.

Stayers Who Did Not Find a Job — An equally important aspect of this analysis concerns stayers who did not find employment after being separated from their first job in 1986. Our calculations show that about half of those people did not find a second job within that calendar year. The proportion

Table 4

Job Finders' Duration of Joblessness by Sectoral Movement, Reason for Separation, and Age, Canada, 1986

	Number of weeks						
	0	1-4	5-9	10-14	15-26	27 or more	Total
	(Per cent)						
All job finders	33.7	30.6	15.0	7.6	9.8	3.2	100.0
Sector							
From goods-sector jobs, to goods-sector jobs	34.7	31.8	11.9	8.3	9.7	3.6	100.0
From goods-sector jobs, to service-sector jobs	27.4	32.9	16.7	7.7	12.4	2.9	100.0
From service-sector jobs, to service-sector jobs	35.1	30.0	15.3	7.4	9.1	3.1	100.0
From service-sector jobs, to goods-sector jobs	30.9	30.3	16.8	7.4	11.1	3.4	100.0
Reason for separation							
Quit (nonpersonal)	47.4	34.1	9.2	3.6	3.6	2.2	100.0
Involuntary	19.5	29.5	21.3	10.9	14.6	4.2	100.0
Age							
16-19	26.5	34.8	19.0	9.0	9.3	1.4	100.0
20-24	30.5	32.2	15.9	7.4	10.1	3.9	100.0
25-34	39.2	28.6	13.5	7.2	8.7	2.9	100.0
35-44	36.5	29.7	14.0	6.2	10.8	2.8	100.0
45-54	34.7	25.1	12.9	10.1	11.4	5.8	100.0
55-64	31.2	30.2	10.9	9.0	12.0	6.6	100.0

SOURCE Estimates by the authors, based on data from the Labour Market Activity Survey, 1986.

Table 5

Mean Duration of Joblessness According to Reason for Separation, by Sectoral, Industry, and Occupational Mobility, Canada, 1986

	Mean duration of joblessness[1]		
	Quit (nonpersonal)	Involuntary	Average
	(Weeks)		
All job finders	5.8	9.6	8.4
Industry mobility			
Stayers			
Same industry	5.5	8,7	7.6
Same industry group	6.7	9.4	9.0
Same sector	6.0	10.2	8.8
Changers			
New industry	6.1	10.0	8.8
New industry group	5.9	10.1	8.7
New sector	5.8	10.1	8.6
Occupational mobility			
Occupation stayers			
Same occupation	5.2	9.2	7.7
Same occupation group	8.9	9.8	10.1
Occupation changers			
New occupation	6.3	9.8	8.7
New occupation group	5.8	9.8	8.4

1 The mean duration of joblessness is calculated for those individuals who had at least one positive week of joblessness between job 1 and job 2.

SOURCE Estimates by the authors, based on data from the Labour Market Activity Survey, 1986.

was greater for those who were in the goods sector (about 56 per cent) than for those who were in the service sector (about 47 per cent). At the same time, a greater proportion of older workers (the 55-64 age group), particularly in the goods sector, did not find a second job in 1986. About 36 per cent of them were jobless for 27 weeks or more during the year. Overall, the possibility that workers who did not find a job in 1986 would be jobless for 27 weeks increased with age.

Long durations of unemployment have major implications for the structure of the labour market and can cause the unemployment rate to rise. If longer spells of unemployment produce a deterioration in the stock of human capital and employers use the length of the unemployment spell as a screening

device, the equilibrium unemployment will rise. In this sense, increasingly long durations of unemployment in an economy indicate a situation where job seekers have experienced a secular decrease in the odds of leaving unemployment rather than a situation in which the rise in unemployment results mainly from increased inflows.[8]

Long spells of unemployment are also a manifestation of the persistent unemployment generated by sectoral shifts. Structural maladjustment in the sectoral pattern of labour demand and labour supply – job vacancies increasing in the expanding sectors and unemployment increasing in the declining or stagnant sectors – can lead to an increase in the duration of unemployment spells. Unemployment in this instance is likely to be due to the impediments to intra-industry and interindustry labour mobility.

A Multivariate Analysis Using LMAS Data

Tables 4 and 5 show how various groups are affected in the transition period between jobs. They do not, however, allow us to infer the relative contribution of each of the characteristics in determining the duration of joblessness. For this, multivariate analysis is required. This type of analysis enables us to estimate the impact of a particular characteristic while controlling for the impact of other characteristics. Is duration higher for the industry stayers or changers? Are there other characteristics that significantly influence the time spent between jobs?

The sample used for the multivariate analysis includes only those who separated from their first job in 1986 and spent some time without a job. Individuals who did not have a job, did not lose a job in 1986, changed jobs but were unemployed less than one week, or were out of the labour force are excluded. The sample consisted of 12,244 individuals, of whom 3,990 found new jobs in 1986 having experienced some unemployment, and 8,254 had yet to find employment by the end of the sample period.

In this analysis, we assume that the amount of time it takes to find a job (D) is a log linear function of an individual's characteristics as well as of the industry and occupation worked in and the nature of the separation. We represent the natural log of duration by d_i, the error by e_i (assumed to be distributed normally), and the characteristics of the individual, the job, and the separation by X_i,

$$d_i = X_i' \beta + e_i \ . \qquad (6)$$

Because observations on the duration of unemployment are available only for those who have completed spells, the sample is right censored. This means that for the observations that we do have, the expected value of e_i need not

be zero and an ordinary least squares (OLS) estimation might result in a biased estimate of β. Equation (7) below explicitly corrects for the bias implied by an error term with a nonzero mean:

$$E\,(d_i/X_i\,,\,d_i = 0) = X_i^{`}\,\beta + E\;(e_i/d_i = 0). \tag{7}$$

However, the exclusion of those individuals who found a job with zero weeks of joblessness from the sample creates problems of selectivity bias. Heckman [1979] has suggested a methodology to estimate equation (7) in order to correct for the right censoring and the selectivity bias. Consistent estimates of the determinants of the duration of joblessness can be obtained by first estimating a probit to predict inclusion (of the truncated spells) in the observed duration of joblessness sample, and then entering the Mills' ratio, predicted from this probit, as an additional variable in the duration equation to be estimated by OLS. The Mills' ratio controls for the expected error in the measurement of duration that may occur if the individuals with the truncated spells are ignored. The two steps in our estimation process, then, were:

Step 1: A probit was estimated for all the job separators in the sample, including those who found a second job in 1986 and those that did not. The dependent variable in this probit was constructed as follows: the separators with a completed spell were assigned a value of 1 and those with the truncated spells a value of 0.

Step 2: A duration of joblessness equation was estimated using OLS. The sample for this equation now included all separators with completed spells of joblessness. The equation estimated was:

$$d_i = X_i^{`}\,\beta + c\,\lambda_i + V_i\,. \tag{8}$$

λ is the inverse of the Mills' ratio computed from the probit and V is a normally distributed error term. β and c are the parameters to be estimated.

Step 1: Estimating the Probability of Finding a Job — Table 6 presents the results of the reduced-form probit estimation for equation (7). The estimated coefficients indicate the effects of the exogenous variables on the probability of finding a job relative to the reference group. The one exception to this interpretation is the coefficient reported for the "tenure in job 1" variable; this is a continuous variable (see Appendix B for definitions of the variables used in the estimation).

The results of the estimation indicate that when separated from a job:

- The probability of finding a new job decreased with age.
- Females were less likely to find a job than males.

Table 6

Maximum Likelihood Estimates of Probability of Finding a New Job

	Reference group	Coefficient	*t*-statistic
Age			
16-19	25-34	0.35	5.76
20-24		0.28	6.33
35-44		–0.01	–0.30
45-54		–0.27	–4.71
55-64		–0.81	–10.89
Female	Male	–0.10	–2.68
Head	Nonhead	0.36	10.13
Student	Nonstudent	–0.42	–8.82
Single	Married	0.08	2.04
Widowed/divorced		–0.10	–1.47
Education			
Elementary	High school	–0.31	–0.63
Some postsecondary		0.05	1.08
Postsecondary		0.29	6.06
University		0.39	6.01
Region			
Atlantic	Ontario	–0.63	–10.95
Quebec		–0.40	–6.18
Prairie		–0.21	–4.16
British Columbia		–0.32	–4.46
Unemployment insurance (UI) and region (interaction variables)			
UI and Atlantic		–0.14	–2.50
UI and Quebec		–0.10	–1.35
UI and Ontario		–0.27	–3.69
UI and Prairie		–0.23	–4.16
UI and British Columbia		–0.19	–2.11
Industry of last job			
Agriculture	Manufacturing	0.15	1.51
Forestry		0.39	3.32
Other primary		0.30	3.56
Construction		0.32	4.26
Distributive services		0.26	4.50
Information services		0.11	1.45
Nonmarket services		0.20	3.09
Personal services		0.26	4.00
Occupation of last job			
Managerial	Construction	–0.13	–1.45

Table 6 (concl'd.)

	Reference group	Coefficient	*t*-statistic
Professional		–0.15	–1.52
Education		–0.07	–0.63
Health		0.06	0.63
Clerical		0.01	0.16
Sales		0.00	0.00
Services		–0.12	–1.64
Primary occupations		–0.11	–1.32
Mining and processing		0.03	0.33
Fabrication		–0.03	–0.30
Transportation		–0.15	–1.89
Other occupations		1.29	6.27
Reason for separation from last job			
Quit (personal)	Quit (nonpersonal)	–1.12	–25.12
Involuntary separation			
– permanent		–0.47	–11.96
– temporary		–0.63	–4.35
Other separation		–0.59	–9.34
Income			
Social assistance		–0.33	–5.88
Worker's compensation		0.09	1.08
Pension		–0.24	–2.67
Tenure in job 1		–0.003	–9.04
Some government training		0.17	2.79
Spell start date			
2nd quarter	1st quarter	–0.23	–5.40
3rd quarter		–0.94	–22.46
4th quarter		–2.01	–41.11
Intercept		1.13	10.98

Dependant variable : found a new job = 1; did not find a new job = 0.
Number of observations
Total = 12,244
Found a new job = 3,990
Did not find a new job = 8,254
Log-likelihood function = –5,360.9.

– The more educated were more likely to find new employment.

– Relative to Ontario, the probability of finding a new job was lower in all the other regions.

– Recipients of unemployment insurance benefits (UIB) had a lower probability of finding a new job. An interaction variable – UIB and REGION – was used to capture the regionally differentiated nature of the unemployment insurance system. This finding also holds for the recipients of the social assistance payments.

– Relative to manufacturing, the likelihood of finding a job was higher in all other industries and more so in most of the service industries.

– Relative to those individuals who quit for nonpersonal reasons, all other separated individuals were less likely to find a job.

– Surprisingly, individuals with higher tenures in their previous job had a lower probability of finding a new job.

Step 2: Estimating the Duration of Unemployment — The major result of the estimation for equation (8) is that interindustry mobility was important in determining the duration of joblessness (see Table 7). The positive and significant coefficient on the "changed industry" variable suggests that among successful job finders, industry changers had longer spells of unemployment than industry stayers.

Other important results are:

– Relative to the prime-aged group (25-34), the estimated coefficients for the other age groups suggest a U-shaped relationship between age and the duration of joblessness – the duration first fell and then rose with age.

– Involuntarily separated workers had higher jobless spells than those who quit their jobs.

– Individuals with more than high school education experienced shorter durations of unemployment.

– Recipients of unemployment insurance benefits and social assistance in all regions experienced longer spells of joblessness.

– Relative to workers in the construction industry, those in the managerial, educational, sales, and service occupations had longer durations of unemployment.

– Relative to manufacturing, none of the industry variables were significant in determining duration of unemployment.

– The coefficient of λ – an indication of selection/truncation bias – is negative, implying a positive selection bias. However, this coefficient is not statistically significant.

Table 7

Duration of Unemployment Equation, Corrected for Selection/Truncation Bias

	Reference group	Coefficient	*t*-statistic
Age			
16-19	25-34	–0.07	–0.96
20-24		–0.12	–2.27
35-44		0.06	1.17
45-54		0.27	3.55
55-64		0.34	2.33
Female	Male	0.008	0.18
Head	Nonhead	–0.24	–4.58
Student	Nonstudent	0.14	2.16
Single	Married	0.11	2.54
Widowed/Divorced		0.05	0.70
Education			
Elementary	High school	–0.04	–0.69
Some postsecondary		–0.07	–1.35
Postsecondary		–0.11	–1.84
University		–0.17	–2.14
Region			
Atlantic	Ontario	0.16	1.62
Quebec		0.09	1.11
Prairie		0.07	1.18
British Columbia		0.15	1.74
Unemployment insurance (UI) and region (interaction variables)			
UI and Atlantic		0.34	4.70
UI and Quebec		0.35	4.05
UI and Ontario		0.47	5.86
UI and Prairie		0.41	6.38
UI and British Columbia		0.38	3.62
Industry and occupational mobility			
New employer	Same employer	0.08	1.14
New industry	Same industry	0.11	2.51
New sector	Same sector	–0.008	–0.19
New occupation	Same occupation	0.05	1.35
Industry of last job			
Agriculture	Manufacturing	–0.06	–0.48
Forestry		0.01	0.09
Other primary		–0.002	–0.02

Table 7 (concl'd)

	Reference group	Coefficient	*t*-statistic
Construction		0.007	0.08
Distributive services		–0.03	–0.39
Information services		–0.07	–0.86
Nonmarket services		–0.005	–0.07
Personal services		0.008	0.10
Occupation of last job			
Managerial	Construction	0.24	2.34
Professional		0.11	1.01
Education		0.52	4.00
Health		0.08	0.75
Clerical		0.08	0.89
Sales		0.17	1.87
Services		0.30	3.42
Primary occupations		–0.02	–0.20
Mining and processing		0.06	0.73
Fabrication		0.11	1.14
Transportation		0.04	0.42
Other occupations		0.23	1.29
Reason for separation from last job			
Quit (personal)	Quit (nonpersonal)	0.99	7.27
Involuntary separation			
– permanent		0.63	10.45
– temporary		1.05	5.93
Other separation		0.45	4.98
Income			
Social assistance		0.31	4.49
Worker's compensation		0.02	0.23
Pension		–0.02	–0.16
Tenure in job 1		0.0007	1.30
Spell start date			
2nd quarter	1st quarter	–0.33	–7.42
3rd quarter		–0.55	–4.96
4th quarter		–0.80	–3.08
Intercept		1.13	8.60
Selection bias (λ)		–0.025	–1.32

Dependent variable : natural log of length of joblessness between job 1 and job 2.
Number of observations = 3,990.
Adjusted R^2 = 0.22.
Mean of dependent variable = 1.60 weeks.
Standard error corrected for selection = 1.00.

The major conclusions from our analysis of the LMAS data are that among successful job finders, industry changers experienced higher unemployment in terms of both incidence and duration than industry stayers. When successful and unsuccessful job finders were considered, however, the contribution of stayers to overall unemployment exceeded that of changers. This result is similar to Murphy and Topel's finding for the United States. Older workers and those involuntarily separated from their jobs were relatively less mobile across industries when seeking new employment. They also experienced longer durations of joblessness and had a (relatively) lower probability of finding a job.

Impediments to Interindustry Mobility

The evidence in the previous section suggests that the mobility rate in the later part of the 1980s was lower than that in the prerecessionary period of the early 1980s. Several factors could have caused that decrease in interindustry mobility, including the industrial restructuring in the 1980s and the resulting composition of employment; the spill-over effects of a decline in employment in one industry on unemployment in another; and uncertainty about employment prospects, which reduces the incentive for separated individuals to search for a job in another sector.

Industrial Restructuring and the Changing Nature of Jobs

In its Twenty-Fifth Annual Review, the Economic Council suggests that the recession in the early 1980s was accompanied by a rationalization of the industrial structure in Canada in response to shifts in demand and supply in domestic and international markets [Economic Council of Canada, 1988]. For example, the rise and subsequent fall of energy prices led to the rationalization of energy-producing as well as energy-using industries. Raw materials producers were faced with depressed prices that led them to reconsider their strategic positions in the international markets. The intensification of global competition affected the production and the structure of the traditional smokestack industries. That restructuring particularly affected goods industries, and had a significant impact on the composition of employment.

The changing composition of employment in turn had a considerable affect on the functioning of Canadian labour markets. The shift of employment to the service sector and changing skill requirements led to increased mismatches between labour demand and labour supply. Another important change in the nature of jobs was the growth of relatively low-paying nonstandard forms of employment. The growth of these forms of employment has presented difficult choices for unemployed individuals who were previously employed in a full-time position. For example, accepting a part-time job could result in a lower

standard of living. Faced with this possibility and the uncertainty of these forms of employment, unemployed individuals could decide to keep searching for a "standard" job and be prepared in the process to remain unemployed for longer durations. Here too, the problem is the mismatch between what is being offered by employers (the labour demand) and what workers want (the labour supply). Evidence suggests that although there has been a growth in low-wage employment, the reluctance of people losing high-wage jobs to accept nonstandard jobs has led to high "wait" unemployment.[9]

Employment Uncertainty

Employment uncertainty can be a major reason for workers to stay in the same industry when separated from a job. For example, workers may be unable to tell whether the reduced demand for the product(s) of the firms for which they work is a temporary cyclical phenomenon or a permanent shift. If it is a permanent shift, then it is in their interests to incur the mobility costs and the loss of firm-specific skills, and to look for employment in another firm or sector. Until it is clear that demand for the firm's product will not recover, however, it is in their interests to wait for a possible recall and/or to look for temporary employment within the same industry. Separated workers may also be uncertain about the employment prospects in other sectors, which is an added incentive to remain in the same sector.

Since employment uncertainty is an *ex ante* concept, quantifying it requires a predictive model. Our model utilized quarterly employment data across one-digit industry classifications over the period 1965-88.

The first step was to estimate a rolling regression of the form:

$$E_{t,j} = a + a_1 E_{t-1,j} + a_2 E_{t-2,j} + a_3 E_{t-3,j} + a_4 E_{t-4,j} + b_1 Q_t + b_2 Q_{t-1} + b_3 Q_{t-2} + b_4 Q_{t-3} \quad (9)$$

where

$E_{t,j}$ = natural log of employment in industry j at time t;
Q_t = deviation of the natural log of real GDP from its quadratic trend.

The estimated model was used to predict employment in industry j at time $(t + 4)$, conditional on the actual values of employment up to time t and on the deviation of the logarithm of real GDP from its quadratic trend up to $(t + 4)$. Using the deviations in real GDP in each of the sectoral regressions enabled the effects of the aggregate fluctuations to be non-neutral across the sectors. The forecasts were then conditioned on future (period $t + 4$) values of the deviations in real GDP in order to purge that measure of sectoral dispersions

from the business cycle effects. We then computed the share-weighted mean squared error of those predictions:

$$\eta_{t+h} = \sum_{j=1}^{n} (E_{t+h,j}/E_t).(\hat{E}_{t+h,j} - E_{t+h,j})^2 \qquad (10)$$

where n denotes number of industries.

Table 8 reports the results of this procedure. The first row in the table reports the η values over different time periods. The second row accumulates the value of η from $h = 1$ to 4 quarters.

Table 8

Weighted Mean Squared Errors in Forecasting Employment, Canada, Selected Periods, 1965-88

	1965-69	1970-74	1975-79	1980-84	1985-88
η_{t+h}	0.16	0.21	0.13	0.23	0.43
$\Sigma_{t+h}\eta_{t+h}$	2.96*	4.21	2.56	4.63	6.39**

NOTE $h = 1$ to 4 quarters.
*The first quarter of 1965 was not included.
**The last quarter of 1988 was not included.
SOURCE Calculations by the authors, based on data from Statistics Canada.

The results suggest that there is increased sectoral employment uncertainty in Canada. There has been an increase in the intersectoral disparity in employment growth rates that could not have been predicted by simple time-series models. That increasing sectoral dispersion was not due to aggregate fluctuations during the time period under consideration. The forecasting error for the period 1985-88, as measured by the mean squared errors, is much larger than those preceding it. This result is not surprising, given the severity of the recession in the early 1980s. The results show a secular trend, and the 1980s do show more volatility than the earlier periods. The anomaly in the results is the forecasting error for the period 1975-79 – it is lower than the value in the preceding period. A more modest claim from our results might be the increasing trends in the forecasting error over the past decade.

Spill-Over Effects

Another factor that affects interindustry mobility is spill-over effects. Changes in employment in one industry affect employment in related industries. For

example, a decline in manufacturing employment that is caused by a decline in demand for manufactured goods (given no technological change) results in a reduction in demand for the other inputs and ancillary services. As a result, unemployment rises in those sectors. The outcome is a convergence of unemployment rates in manufacturing and the sectors related to manufacturing.

This convergence inhibits the mobility of workers. To go back to our previous example, workers released from the manufacturing sector would find it more difficult to obtain employment in industries related to manufacturing, which would normally be their natural alternative source of employment on the basis of skill requirements. This might provide more incentive to stay within the same sector, or alternatively, to spend more time looking for employment in other sectors.

To establish whether spill-over effects exist and whether they are important determinants of sectoral unemployment patterns, we estimated the following equation for the period 1975-87:

$$UR_{it} = a + b.time + c.e_{ij} + u_t \qquad (11)$$

where $j = 1, 2, \ldots 7$, and $i = 1, 2, \ldots 5$. UR_{it} is the unemployment rate in industry i at time t, and e_{ij} is the employment growth in industry j. The equation included the own-industry employment growth rate as an explanatory variable as well.

The results of these estimations suggest that the sector generating the most significant spill-over effects in Canada is the manufacturing sector (see Table 9). A decline in manufacturing employment causes a rise in the unemployment rates in construction, the wholesale and retail trades, communications, and business and personal services. Of all the spill-over effects, the one with the greatest impact is the unemployment in the construction industry caused by a change in manufacturing employment.

In the manufacturing sector, the spill-over effect is probably the result of both a change in the input demand in this sector and the loss of demand for products of other sectors because of a loss in income: as unemployment increases in the manufacturing sector, the income of workers declines. However, the spill-over effects generated by community, business, and personal services are probably entirely due to the income effect, an indication of the importance of these services as a source of employment in the Canadian economy.

Constraints on Sectoral Mobility Among Older Workers

The constraints on mobility discussed earlier may have a greater impact on older workers, given their high levels of skill specificity and the non-labour-market constraints they face. Also critical is their wage profile: since they tend to receive higher wages, they have a lower incentive to change jobs.

Table 9

Interindustry Spill-Over Effects,[1] Canada, 1975-87

	Dependent variable: change in unemployment rate in				
	Construction	Manufacturing	Transportation	Trade	Community, business, and personal services
			(Per cent)		
Independent variable					
Time trend	–0.018	–0.011	–0.007	–0.009	–0.008
	(2.538)	(1.802)	(1.350)	(3.074)	(2.273)
Employment growth in					
Agriculture	0.030	–0.005	0.019	–0.036	0.004
	(0.595)	(0.174)	(0.700)	(1.467)	(0.209)
Other primary industries	–0.060	–0.044	0.004	0.009	–0.010
	(1.438)	(1.782)	(0.192)	(0.529)	(0.638)
Manufacturing	–0.253	–0.319	–0.063	–0.143	–0.058
	(–2.702)	(5.428)	(1.237)	(3.483)	(1.494)
Construction	–0.147	0.029	0.026	–0.004	–0.033
	(2.289)	(0.784)	(0.787)	(0.128)	(1.275)
Trade	–0.146	–0.088	–0.026	–0.085	–0.011
	(1.158)	(1.209)	(0.389)	(1.590)	(0.229)
Transportation	–0.284	–0.039	–0.197	–0.081	–0.043
	(3.153)	(0.708)	(3.936)	(2.009)	(1.178)

Community, business, and personal services	–0.043 (0.314)	–0.165 (1.977)	–0.034 (0.433)	–0.104 (1.789)	–0.063 (1.173)
Constant	0.881 (3.384)	0.623 (2.929)	0.325 (1.726)	0.477 (4.669)	0.382 (3.071)
Durbin-Watson	1.965	1.939	1.937	2.055	2.003
R^2	0.687	0.701	0.377	0.590	0.452

1 Measuring the effects of changes in employment on changes in unemployment rates. Unemployment rates for other primary industries were not available. The equation for agriculture is not reported due to poor fit. The figures in parentheses are *t*-statistics.

Source Calculations by the authors, based on data from Statistics Canada.

The mobility patterns of older workers have been determined, in part, by the increased supply of mobile young workers who have been entering the work force since the 1970s and expect to work for lower wages. The relative mobility of younger workers may affect the sectoral mobility of older workers because they anticipate earning less if they move from one industry to another and sacrifice their specific capital or seniority. The net impact may be a lowering of the returns to mobility for older workers and an increase in the relative returns to waiting for re-employment. This point is borne out by the fact that in 1982 about 50 per cent of older workers who separated from their jobs were re-employed with the same employer.[10] The attachment of older workers to their former employers and industries appears to be strong in Canada.

Finally, other explanations have been offered for the (relatively) longer durations of joblessness among older workers.[11] It has been argued that the observed adjustment difficulties of these workers may also be due to their search behaviour and the hiring practices of the employers. With regard to the former, older workers are said to prefer more leisure in comparison with younger workers, which leads them to search less intensively for jobs. With regard to the latter, employers may use age as a discriminating factor because they consider that the investment required (in terms of training) might not justify the return they expect to get from older workers. The evidence based on the LMAS of 1986-87 suggests that the search intensity of older workers is no different from that of prime-aged workers, leaving discrimination by employers as the most plausible explanation for older workers' relatively longer periods of joblessness.[12]

Conclusions and Inferences

In this paper we have analysed patterns of interindustry mobility, unemployment, and labour market adjustment in the 1980s, using time-series as well as cross-sectional evidence.

We find that interindustry labour mobility displays a procyclical pattern. The mobility rate in 1985-86 was lower than that of the prerecessionary period of 1980-81. To the extent that interindustry labour mobility is an indicator of the labour market adjustment process, the lower mobility rate in 1985-86 indicates a slower adjustment process in this market.

The evidence from the LMAS indicates that:

- The unemployment experience of the majority of the job finders can be viewed as frictional in nature and part of the efficient functioning of the labour market. Industry changers accounted for a higher proportion of this joblessness than those who found new job in their original industry.

- The involuntarily separated and older job finders experienced relatively higher durations of unemployment.

- About 20 per cent of the separated who did not find a job in 1986 remained jobless for over six months. Older workers and involuntarily separated workers bore a disproportionate burden of this unemployment.

- The presence of factors such as unemployment uncertainty and spill-over effects may have led to a decline in interindustry mobility and an increase in long durations of joblessness, particularly among those who did not find a job.

The evidence provides mixed signals about the ability of the sectoral-shifts hypothesis, as interpreted by either Murphy and Topel or Lilien, to explain fluctuations in Canadian unemployment. On the one hand, the procyclical nature of interindustry labour mobility supports Lilien's hypothesis, but not Murphy and Topel's. On the other hand, the fact that changers experienced higher durations of unemployment than stayers fits Murphy and Topel's hypothesis, but not Lilien's. What is clear, however, is that shifts in sectoral economic activities do have a significant impact on the labour market adjustment processes.

If unemployment fluctuations are primarily caused by sectoral shocks, aggregate demand policies may not be the most effective tool to combat them. About the only situation where such a policy might be effective is when there are high spill-over effects. Expansionary aggregate demand policies may help offset these spill-over effects and ease the process of labour reallocation. However, our empirical analysis suggests that spill-over effects are generated by a few sectors, and felt only in a few related sectors. In these circumstances, aggregate demand policies may be too heavy-handed.

Policies designed to facilitate the adjustment of the labour force across industries and across regions may have a higher pay-off where there is a sectoral shift. One key policy consideration here is what happens to the level of specific training in the aftermath of a large sector-specific shock. If there are employment uncertainties, this indicates that when relative labour demands are affected by permanent and transitory shocks, specifically trained labour will not move to new opportunities until uncertainty about the permanence of the shock is resolved. Thus unemployment spells may be prolonged as trained workers wait for the recovery to occur or for the situation to become clearer. In the event that the shock is permanent, people who become unemployed and eventually find employment sacrifice previously accumulated skills in the transition. Thus, after a large sector-specific shock, the average amount of specific training will be lower, so that there will be a pool of marginal workers who are susceptible to unemployment. This is the process that leads

to a higher natural rate of unemployment after a shock. The natural rate will probably decrease as specific training for these workers in other occupations or sectors accumulates over time. In this scenario, ameliorating unemployment rests on policy provisions that encourage the accumulation of alternative specific training. The policy context is the facilitation of the industrial reallocation of labour from declining to expanding sectors.

Appendices

A The Labour Market Activity Survey, 1986

The Labour Market Activity Survey (LMAS) was sponsored by Employment and Immigration Canada. It was conducted as a supplement to Statistics Canada's Labour Survey in January and February, 1987. The survey documents the labour force experience in 1986 of almost 67,000 individuals. Of those, 51,000 participated in the labour market during the year. These 51,000 observations were assigned varying weights to represent the 13.7 million persons active in the Canadian labour market at some time during 1986. The results reported in this paper are based on this weighted form.

The LMAS was repeated in 1988, chronicling the experiences of the same individuals (as those in the previous survey) for 1987.

Our Subsample

The analysis in this chapter uses a subsample from the LMAS. The LMAS reports up to a maximum of five jobs per individual during 1986. However, the number of observations for third, fourth, and fifth jobs held during the year is too low, statistically speaking. For this reason, our subsample consists of the first and second jobs only. Thus the observations under consideration were of individuals who separated from the first job they held in 1986 and who did, or did not, find a second job in the same year. The fact that a number of individuals surveyed held more than one job simultaneously made it difficult to observe the separation from one (the first) job. We resolved this problem by excluding job overlaps whose durations extended beyond four weeks from the subsample.

Industrial and Occupational Classifications

The LMAS identifies the industry and occupation categories of each job held in 1986 according to 52 industries and 49 occupational categories (see box). These industries and occupations are themselves aggregations of three-digit Standard Industrial Classification (SIC) codes. The results in the current study often report industry and occupation information in three ways:

1 Industry/occupation: the units here are the 52 industries and 49 occupational groups.

2 Industry/occupational group: the industry groups were aggregated into seven industry groups. The occupations were combined into 13 occupational groups.

3 Same or new (industry) sector: the industries were summed up into two sectors – the goods and the service sectors.

Industry Categories	LMAS code range
Goods sector groups	01-30, 52
Primary	01-08
Manufacturing	09-28
Construction	29-30, 52
Service sector groups	31-51
Distributive services	31-36
Information services	37-39, 44
Nonmarket services	40-41, 48-51
Personal services	42-43, 45-47
Occupation Categories	
Occupation groups	
Managerial	01-03
Professional	04-09
Education	10-12
Health	13-16
Clerical	17-22
Sales	23-24
Services	25-28
Primary occupations	29-32
Mining and processing	33-37
Fabrication	38-42
Construction	43-45
Transportation	46-49
Other occupations	50

Reasons for Separation

Several reasons for separation are listed in the LMAS. We divided them in four groups as follows:

Quit (personal)	Personal or family responsabilities (including changes in family circumstances, serious family illness, etc.); changed residence; and retirement.
Quit (nonpersonal)	Dissatisfaction with job because of: low pay; lack of opportunity for advancement; lack of opportunity to use training or skills; unsatisfactory working conditions including physical conditions, transportation problems and hours of work; worries about layoffs, job security or reduction in work hours; move to a new job; and return to school.
Involuntary	Job losses: employer-initiated separation; seasonal nature of job; nonseasonal economic or business conditions; company moving or going out of business; installation of, or conversion to, new equipment; an on-call arrangement; end of a temporary nonseasonal job; dismissal by the employer; sale of the business firm.
Other	Other listed reasons for separation in the survey or not specified.

B Definitions of Variables

Definitions of Variables Used in Tables 6 and 7

Age		
16-19		= 1, 0 otherwise
20-24		= 1, 0 otherwise
25-34		= 1, 0 otherwise
35-44		= 1, 0 otherwise
45-54		= 1, 0 otherwise
55-64		= 1, 0 otherwise
Sex	female	= 1, 0 otherwise
Head of the household		= 1, 0 otherwise
Student		
Did you attend a school, college or university as a full-time student at any time during 1986?		= 1, 0 otherwise
Marital status		
Married		= 1, 0 otherwise
Single		= 1, 0 otherwise
Widowed/divorced		= 1, 0 otherwise
Education		
Elementary		= 1, 0 otherwise
High school		= 1, 0 otherwise
Some postsecondary		= 1, 0 otherwise
Postsecondary		= 1, 0 otherwise
University		= 1, 0 otherwise
Region		
Atlantic		= 1, 0 otherwise
Ontario		= 1, 0 otherwise
Quebec		= 1, 0 otherwise
Prairies		= 1, 0 otherwise
British Columbia		= 1, 0 otherwise

Unemployment insurance (UI) and region (interaction variables)

UI and Atlantic	= 1 if received unemployment insurance benefits in 1986 and a resident of Atlantic provinces, 0 otherwise.
UI and Quebec	= 1 if received unemployment insurance benefits in 1986 and a resident of Quebec, 0 otherwise.
UI and Ontario	= 1 if received unemployment insurance benefits in 1986 and a resident of Ontario, 0 otherwise.

UI and Prairies	= 1 if received unemployment insurance benefits in 1986 and a resident of Prairie Provinces, 0 otherwise.
UI and British Columbia	= 1 if received unemployment insurance benefits in 1986 and a resident of British Columbia, 0 otherwise.

Occupation of previous job

Managerial	= 1, 0 otherwise
Professional	= 1, 0 otherwise
Education	= 1, 0 otherwise
Health	= 1, 0 otherwise
Clerical	= 1, 0 otherwise
Sales	= 1, 0 otherwise
Services	= 1, 0 otherwise
Primary occupations	= 1, 0 otherwise
Mining and processing	= 1, 0 otherwise
Fabrication	= 1, 0 otherwise
Transportation	= 1, 0 otherwise
Construction	= 1, 0 otherwise
Other occupations	= 1, 0 otherwise

Industry of first job (see Appendix A)

Agriculture	= 1, 0 otherwise
Forestry	= 1, 0 otherwise
Other primary	= 1, 0 otherwise
Manufacturing	= 1, 0 otherwise
Construction	= 1, 0 otherwise
Distributive services	= 1, 0 otherwise
Information services	= 1, 0 otherwise
Nonmarket services	= 1, 0 otherwise
Personal services	= 1, 0 otherwise

Reason for separation from first job (see Appendix A)

Quit (personal)	= 1, 0 otherwise
Quit (nonpersonal)	= 1, 0 otherwise
Involuntary separation (permanent)	= 1, 0 otherwise
Involuntary separation (temporary)	= 1, 0 otherwise
Other separation	= 1, 0 otherwise

Income

Social assistance	= 1 if received social assistance or welfare benefits during 1986, 0 otherwise.
Worker's compensation	= 1 if received worker's compensation benefits during 1986, 0 otherwise.
Pension	= 1 if covered by a supplementary pension plan in addition to CPP, 0 otherwise.

Employer/industry/occupational mobility

New employer	= 1 if changed employer in the second job, 0 otherwise.

Changed industry	= 1 if changed industry in the second job, 0 otherwise. We consider 52 LMAS industries (as documented in Appendix H of the LMAS Microdata Users Guide).
Changed sector	= 1 if changed industrial sector, 0 otherwise. We aggregated 52 industries into nine "industry groups" (as discussed above) and two sectors – the goods sector and the service sector (see Appendix A).
New occupation	= 1 if changed occupation, 0 otherwise. We consider 50 LMAS occupations (as documented in Appendix I of the LMAS Microdata Users Guide). These 50 occupations are aggregations of three-digit Standard Occupation Classification codes.
Tenure in job 1	= This is a continuous variable and is defined as length of employment in job 1 in months.
Some government training	= 1 if the individual did participate in any job creation, work experience, skill training or other employment related program sponsored by the government, 0 otherwise.
Spell start date	
1st quarter	= 1 if the individual was separated from job 1 in the first quarter of 1986, 0 otherwise.
2nd quarter	= 1 if the individual was separated from job 1 in the second quarter of 1986, 0 otherwise.
3rd quarter	= 1 if the individual was separated from job 1 in the third quarter of 1986, 0 otherwise.
4th quarter	= 1 if the individual was separated from job 1 in the fourth quarter of 1986, 0 otherwise.

Notes

1 An alternative theoretical model also proposed by Lilien [1984] considers the microeconomic aspects of the labour reallocation process. The starting point in this model is an efficiently functioning labour market where employment is determined by the equality of the marginal revenue product of labour and the opportunity cost of labour. However, the labour flows across the sectors are slow. Suppose a disproportionate sectoral shock takes place in such a model. Aggregate employment will fall in response to these sectoral shifts as the employment hours fall more in firms with the declining demands than they rise in firms with growing product demand. This conclusion follows from the standard assumptions of the declining marginal productivity of labour in employment and the decreasing marginal utility of leisure. The result is an increase in unemployment. However, the theory allows for the equilibrium to be re-established over time as labour (slowly) flows out of the lower marginal revenue product sectors to the higher marginal productivity sectors.

2 For recent developments in theoretical literature on sectoral shifts and aggregate unemployment, see Storer [1990].

3 Much of the empirical debate in the macroeconomic empirical literature has been about the legitimacy of the use of this proxy as a measure of sectoral shifts. The controversy has centred around questions such as: Is the employment-dispersion measure independent of aggregate-demand influences? Is it a truly exogenous variable?

One problem is that the employment-dispersion indices constructed by Lilien do not distinguish between changes in sectoral employment brought about by aggregate disturbances and those caused by sector-specific disturbances. However, such a distinction has considerable implications for policymakers. If the proxy is independent of aggregate demand and has a strong influence on the movement of unemployment rates – as Lilien [1982] and Samson [1985] suggest for the United States and Canada, respectively – then most of the recent rise in unemployment could be considered structural, and the appropriate policy option would be a fine tuning of labour market policies. If, however, the proxy also reflects aggregate-demand influences – as Abraham and Katz [1986] find for the United States – the policy implications are not so clear-cut and might involve a combination of aggregate-demand and specific labour market policies. The empirical issue is whether it is possible to resolve this debate by purging the employment-dispersion index of aggregate-demand influences. Abraham and Katz found that the purged measure was ineffective in explaining movements in unemployment rates. Attempting the same exercise for Canada, Neelin [1987] decomposed variations in

employment growth in various sectors into their aggregate-demand, regional, and sector-specific components. Her findings were similar to those of Abraham and Katz in that she also found that the aggregate-demand component accounted for the major portion of the variation in unemployment rates. Other researchers have argued that the index is not a truly exogenous variable but is the result of several exogenous events [for example, Burns, 1990; and Loungani, 1986].

4 Another inference drawn by Murphy and Topel on the basis of the sectoral-shifts hypothesis is that the distribution of unemployment arising from sector-specific shocks will be non-neutral across the economy. However, they found that in the United States, "the trend toward higher unemployment is not heavily concentrated in particular sectors in the economy. Unemployment has increased in all major industries, in all age and schooling groups, and in all major regions of the country. The timing and magnitude of changes in unemployment are very similar across identifiable groups." The broad-based neutrality of the unemployment experience led them to question the importance of sector-specific factors as a determinant of the unemployment in the United States. However, they did not rule out all influences. Changes in one sector can spill over in other sectors, particularly the related ones. Murphy and Topel find that the manufacturing sector generates geographically concentrated spill-over effects. These spill-over effects may provide some explanation of the apparent aggregate neutrality in unemployment rates, especially if the effects are large and are transmitted rapidly.

5 Osberg [1988*a*] extends his analysis to the relationship between interindustry mobility and local unemployment rates for the 67 economic regions in Canada. His logit estimates suggest that for female workers there is a significant negative relationship between interindustry mobility rates and unemployment rates. He does not find a statistically significant relationship for males.

6 In sharp contrast to the industrial mobility patterns, a large proportion of the separated workers took on new occupations in their second jobs. Slightly more than one third of the job finders stayed with their previous occupation, about 10 per cent moved to a closely related occupation (same occupation group), and approximately 52 per cent found a second job in a radically different occupation. There was very little difference between the occupational mobility patterns of the quits and those of the involuntarily separated.

7 See Rahman and Gera [1990*b*].

8 Various explanations have been offered for the persistence of unemployment. These explanations focus on the behaviour of unemployment flows

and their implications for the duration structure of unemployment. The major question asked is: Is the secular increase in unemployment a result of increased inflows to unemployment or substantial decreases in outflows from unemployment [Darby et al., 1985; 1986]? Supply-side-based explanations of persistence in unemployment suggest that the reason for the rise in persistence is the workers' slowness to accept available jobs [Flanagan, 1988]. This slowness could be due to the declining search intensity of the unemployed [Layard and Nickel, 1987]. There have been demand-based explanations of persistence as well. It has been argued that employers may become more reluctant to hire [Flanagan, 1988]. The reasons for this hiring reluctance could be the growth of fixed employment costs, uncertainty about the quality of new employees, and increased uncertainty about future (product) demand. Another reason based on both demand and supply considerations is that workers who expect to be recalled by their employers at time of layoff and subsequently are not recalled tend to have extremely long unemployment spells [Katz and Meyer, 1987]. Finally, persistence could also be due to the dynamic disincentive effects of the unemployment insurance program [Milbourne et al., 1989].

9 See Gera and Grenier [1991]; and Summers [1986].

10 See Canada, Department of Employment and Immigration [1985].

11 See Rahman and Gera [1990*a*]; and Corak [1990].

12 See, for example, Corak [1990].

List of Tables

1	Aggregate Unemployment and Interindustry Mobility, Canada and the United States, 1980-81, 1982-83, and 1985-86	7
2	Sectoral and Industrial Movement of Job Finders, by Reason for Separation and Age, Canada, 1986	10
3	Sectoral Movement of Job Changers and Reason for Separation, by Sectors of Origin and Destination, Canada, 1986	11
4	Job Finders' Duration of Joblessness by Sectoral Movement, Reason for Separation, and Age, Canada, 1986	13
5	Mean Duration of Joblessness According to Reason for Separation, by Sectoral, Industry, and Occupational Mobility, Canada, 1986	14
6	Maximum Likelihood Estimates of Probability of Finding a New Job	17
7	Duration of Unemployment Equation, Corrected for Selection/Truncation Bias	20
8	Weighted Mean Squared Errors in Forecasting Employment, Canada, Selected Periods, 1965-88	24
9	Interindustry Spill-Over Effects, Canada, 1975-87	26

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